Feasibility Analysis of Increasing the Student Transportation Methods on UBC Vancouver Campus

For
Michael White
Associate Vice-President
UBC Campus + Community Planning
University of British Columbia

By
Aman Johal
English 301 Student

Date

Table of Contents

Abstract

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Introduction

Background on Student Punctuality

The University of British Columbia (UBC) is one of the largest institutions in Canada, not only by enrollment, but the Vancouver campus boasts an area of over 400 hectares in size. With a large number of course offerings combined with the size of the campus, it is not uncommon to have a course schedule that takes you all over campus. Navigating between classes and buildings on UBC Vancouver campus can be a challenging and time-consuming task for many students. Especially when classes are spaced far apart, students may find themselves rushing to get to their next class on time, which can be a significant source of stress. At a time when stress levels are remarkably higher (Robotham and Julian 2006) in one's life, it is prudent to take any step to mitigate student stress levels.

Frequent lateness to class can have negative consequences. Students that are habitually late to class are more likely to perform poorly on exams (Gottfried, 2014). In addition, the disruption not only affects the student, but can have detrimental academic effects on classmates as well (Gottfried, 2014).

Overview of Current Campus Transportation Methods

Currently UBC Vancouver campus hosts one micromobility ridesharing option. Micromobility refers to small lightweight vehicles. These vehicles have an emphasis on

portability, maneuverability whilst generally boasting a minimal ecological footprint (Molinares et al., 2022). Common micromobility vehicles include bicycles, scooters (both manually powered and electric motor powered).

UBC Vancouver offers a bike sharing option available to students as it micromobility service, HOPR. In order for bikesharing operations to be successful the service needs to include adequate app functionality, station (pick-up/drop off) location density, and a fair pricing structure (Peters and MacKenzie, 2019). App functionality ensures an enjoyable user experience coupled with the reliable functionality to reserve a bike and end a trip. Currently, HOPR operates via a mobile application, and it has dedicated pickup and drop off locations.

Purpose of Report

The purpose of this report is to determine the feasibility of implementing electronic scooters (e-Scooter) as an additional micromobility ridesharing option to facilitate a quicker, more effective, and more efficient means of transportation around UBC Vancouver campus. This report is an important step towards reducing one of the student stressors at the UBC Vancouver campus.

Background on e-Scooters

e-Scooters are the latest in shared mobility. They offer a cheap, convenient, and flexible way to traverse dense urban areas. Their hallmark is accessibility and portability, as users can range from professors to students. Moreover, most e-Scooter implementations exist in a grab and go system, meaning no charging docks and no parking corals (Shellong et al., 2019). The e-

Scooter has the end user goal of "completing the final mile" (Shellong et al., 2019) of your transportation journey.

Research Methods

An email questionnaire was sent to the UBCO Sustainability Office, UBCO has implemented e-Scooter and eBike sharing on their campus. The questionnaire was aimed to gauge what the ridership and sentiment is towards these micromobility services and what hurdles were/are faced for the implementation. A transcript of the questionnaire and answers can be found in the Appendix A. 25 students responded to a brief survey designed to analyze student perceptions towards the issue of being late to class, what the student's opinion of HOPR is, and what the student looks for in terms of using a micromobility service. The full list of student questions can be found in the Appendix. Lastly, a summary of existing primary literature is presented to explore the feasibility and benefits of micromobility ridesharing in a small urban setting.

Limitations of the Study

The main limitation of this study is the small sample size of primary data. By only emailing one other university campus (and one individual) there is potential for bias regarding employee opinions on Lime vehicles on campus. Furthermore, the student surveys garnered a number of responses, and without knowing the demographic of who filled out the survey it is difficult to concede no bias. Further research may be required to obtain a larger sample size that more accurately represents the student and staff opinions.

Scope of the Report

This report will aim to address the following questions:

1. Is the student body frustrated at back-to-back classes and the difficulties of attending class on time?
2. What are the key hesitations towards students not using the current micromobility option, HOPR?
3. How large is the demand for a more convenient rideshare option, particularly e-Scooters?
4. What are the potential challenges with introducing a new micromobility ridesharing option with regards to key stakeholders?

Overall, the report concludes by acknowledging the benefits and challenges associated with implementing an e-Scooter micromobility service whether it be sharing the landscape with HOPR or replacing.

Data Section

Data Section A: Questionnaire with UBC Okanagan Campus

This section outlines the brief questionnaire sent to…

Current Sentiment Towards Micromobility Services

Awaiting response.

Implementation and Maintenance Hurdles

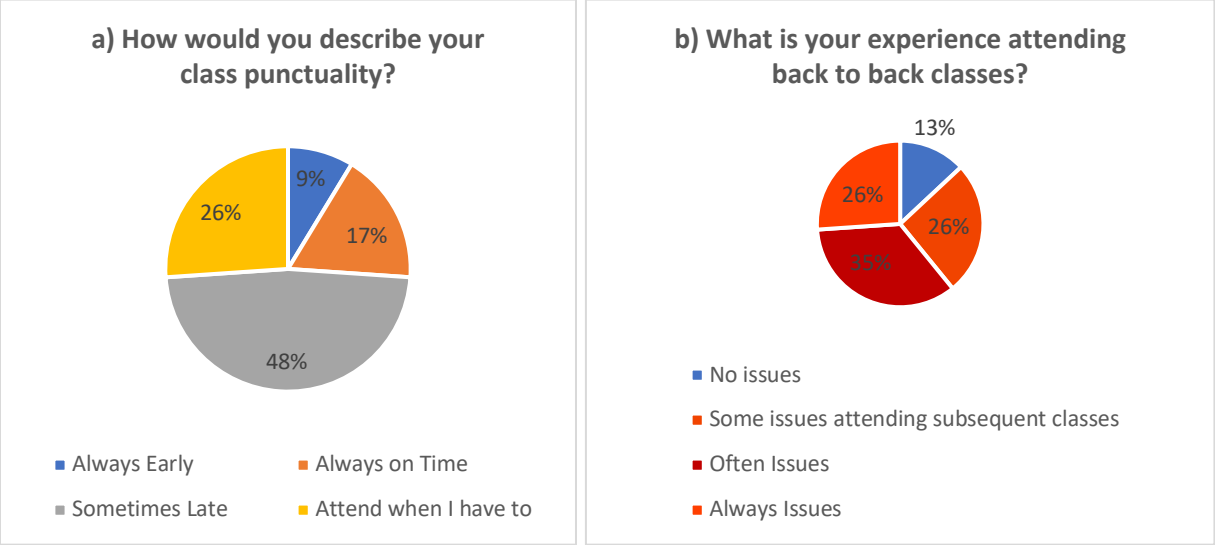
Awaiting response

Data Section A: Student Opinions of Micromobility Services and Campus Transportation

This section reports survey responses from UBC Vancouver students and interprets their opinions on the level of difficulty they have attending classes that are spread out across campus, what their current feelings towards HOPR ridesharing is, and preferences towards other ridesharing services.

Impact of Attending Back-to-Back Classes

Out of 25 respondents, students were asked how they would describe their class punctuality, the majority, 47.8% reported that they were sometimes late (Figure 1a). 87% of UBC Vancouver students expressed some level of difficulty in attending classes when they are scheduled subsequently (Figure 1b). When asked to elaborate on their difficulties, students responded with “Impossible in 10 mins” and “Frustrating having to rush across campus in 10 minutes”. Furthermore, when asked how being late to class made students feel 81% admitted to feeling some level of stress, anxiety and/or embarrassment, while 15% reported feeling fine (Figure 1c).



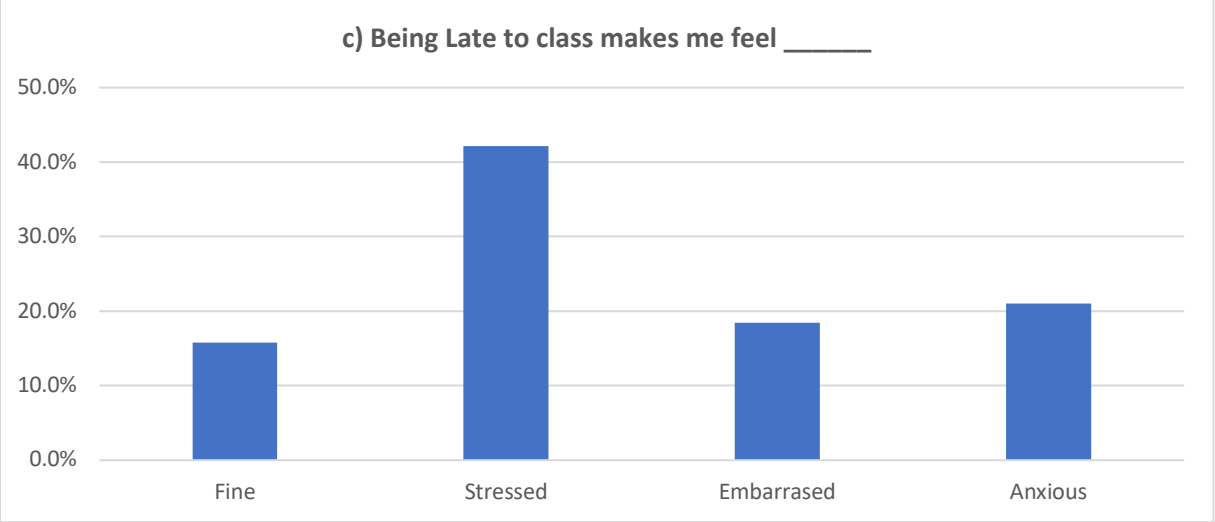


Figure 1: a) Student self-declarations on their class punctuality. b) Student reported punctuality with regards to back to back classes. c) Student opinions on how they feel when they are late to class

Source: Data collected using UBC Qualtrics Survey Tool. Charts created using Microsoft Excel.

Current Opinions on HOPR Rideshare

When asked if they have ever used the campus bikeshare option HOPR 57% percent of students responded that they either never or rarely used HOPR, while the Reponses (43%) cited using HOPR sometimes or occasionally (Figure 2a). No respondents reported using HOPR often.

Those that do use HOPR were asked to describe their experience, of the 17 responses the majority, 7 (41%), stated that their experience was “Sometimes difficult and inconvenient. While only one user (5.88%) selected that their experience was easy and convenient (Figure 2b).

Survey takers were then asked to gauge the following statement “Finding and parking a HOPR bike is accessible”. Of the 23 respondents to this question 17 (73.9%) stated that they either somewhat disagreed or neither agree nor disagreed with the statement (Figure 2c).

Lastly students were asked about the cost associated with HOPR. 65% considered the price of HOPR to be reasonable or not unreasonable, while 35% found the price to be unreasonable (Figure 2d).

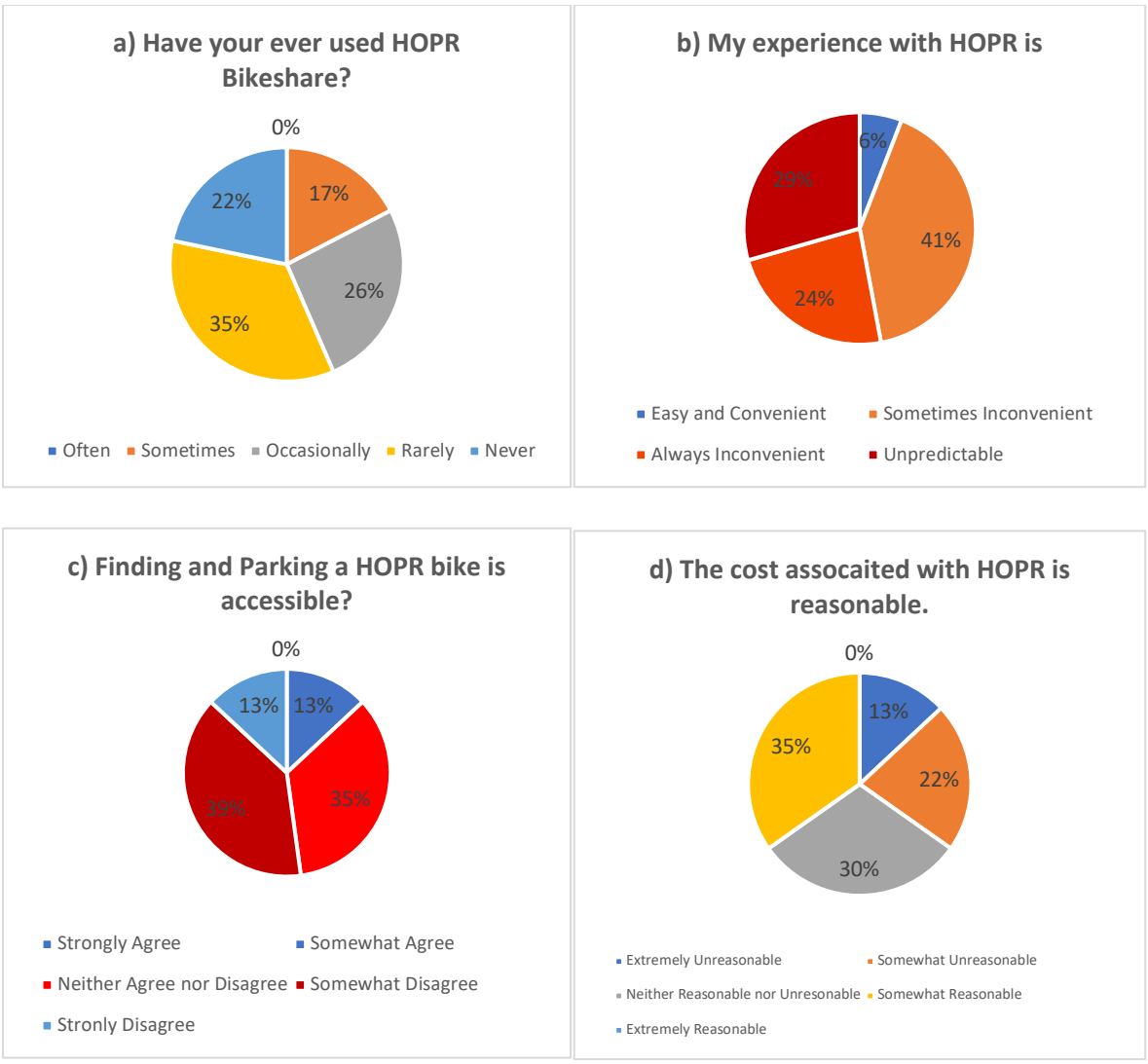


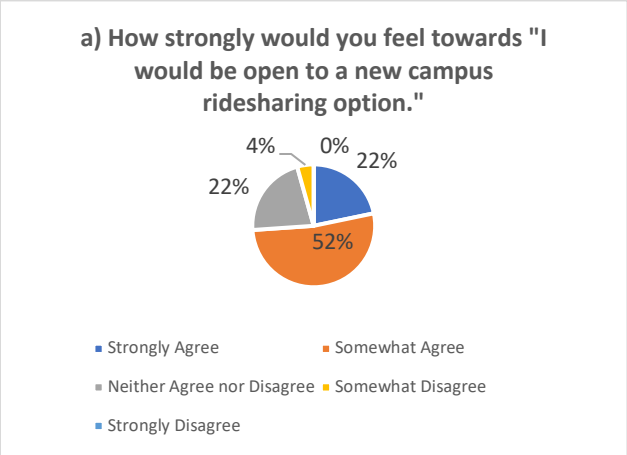
Figure 2: a) Student responses as to whether they have used HOPR bikeshare. b) Student opinions on their experience with HOPR. c) Student opinions on the ease of access of HOPR. d) Student opinions on the cost associated with using HOPR.

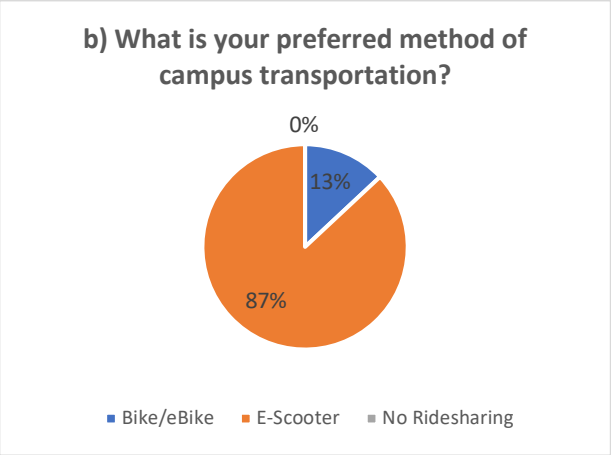
Source: Data collected using UBC Qualtrics Survey Tool. Charts created using Microsoft Excel

Interest in Alternative Micromobility Service

In the final installment of questions students were gauged on their willingness and opinions towards alternative campus ridesharing services. Firstly, students were asked their opinion on the statement “I would be open to an alternative campus ride/bike/scooter sharing option”. 74% agreed or strongly agreed with that statement (Figure 3a). In a follow up question when asked what type of micromobility service the student would want 87% responded with e-Scooter as opposed to bike/eBike or other (Figure 3b).

In the final question students were asked to rank the importance of the following when considering using a rideshare option: low cost, easy to use, pick-up/park anywhere, safety, no membership signup, and quickest method of transport. The highest ranked/most important option according to student responses was pick-up/park anywhere (31.6%), followed by low cost (26.3%) (Figure 3c). The lowest ranked importance factor was safety at 5% of respondents ranking it first while 31.6% ranked it least important (Figure 3d).





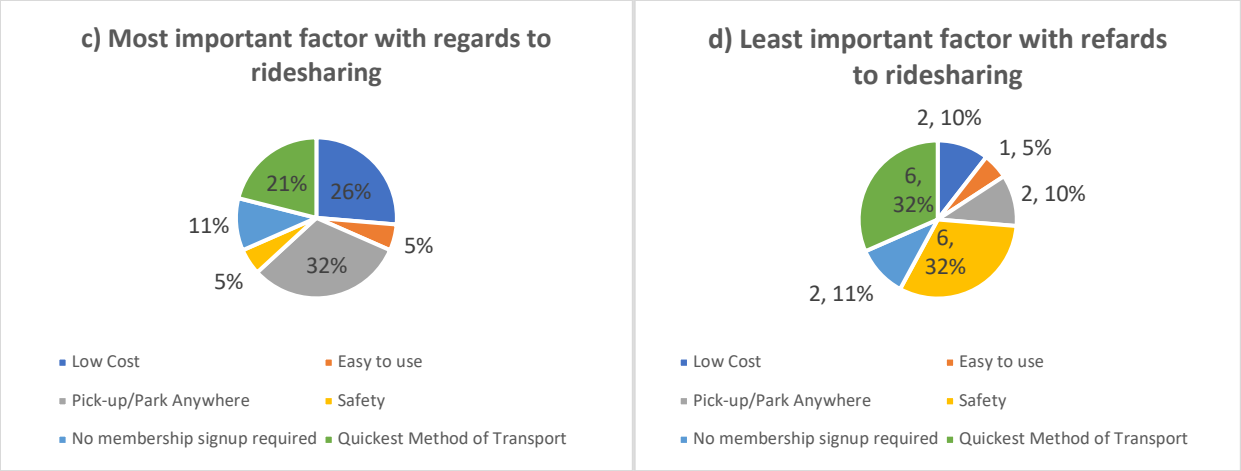


Figure 3: a) Student opinion towards the statement of wanted a new campus rideshare option. b) Student opinion on their preferred transport method. c) Distribution of highest ranked options for ridesharing factors. d) Distribution of lowest ranked options for ridesharing options.

Source: Data collected using UBC Qualtrics Survey Tool. Charts created using Microsoft Excel

Data Section C: Summary of Secondary Research

This section provides a summary of the existing research surrounding micromobility services in small urban communities including university campuses.

Research for the Support of E-Scooters

Micromobility services have a wide adoption across North America, they are particularly popular in clustered downtown areas and university campus areas (Bai et al., 2021). E-Scooters offer a variety of community improvements, convenient transportation, flexibility, and pleasant rider experience (Jiao and Bai, 2020). Companies like Lime and Bird offer services that allow the user to cover intermediate distances in a reduced amount of time. E-Scooters seek to solve the

transportation issue of first/last mile (Jiao and Bai, 2020). This concept stems from the issue of getting to your destination from a major public transport hub. E-Scooter trips are on average less than 2 kilometers (Schellong et al., 2019) which can be the equivalent of walking 15 to 20 minutes. They are cheaper than hailing a taxis and come with the added bonus of not causing any sweating.

When compared to eBike sharing, e-Scooters are seen as more accessible and more popular amongst a younger demographic, as the user only needs to stand and does not need to sit (Almannaa et al., 2020). In addition, e-Scooters travel at a slower pace than eBikes which offers some safety benefits (Almannaa et al., 2020).

Another benefit of e-Scooters, and one of the more highly contentious issues is the dockless system that e-scooters offer. E-scooters often do not have designated parking corals and can be picked up and dropped off at the users preference (Buehler et al., 2022).

Overall, these studies highlight the popularity of e-Scooters on a university campus as these devices aim to solve the issue of getting around campus. In addition, the literature shows why ridership and demand can be higher in e-Scooters compared to e-bikes, through ease of use and accessibility. It is important to note that current literature suggests that when e-Scooters are introduced in a setting in which e-bikes have already been established, e-bike ridership only decreases 10.2% (Yang et al., 2021).

Research Against E-Scooters

The most heralded claim against e-Scooters is the irresponsible parking on sidewalks or green spaces (Jiao and Bai, 2020). The flexibility of a dockless system and being able to grab and go anywhere has resulted in scooters being ditched along the road or parked illegally. Cities or campuses that implement e-Scooters have the option to implement specific parking areas, however this has been associated with a decline in usership (Beuhler et al., 2022).

Furthermore, with the introduction a new micromobility service, e-Scooters can clutter up pedestrian traffic routes (Holley, 2019). Brazen e-Scooter usage has been associated with many pedestrian collision injuries, whether it be maneuvering through walkways or leaving a scooter in the middle of a high traffic area (Holley, 2019). Safety concerns are not just limited to pedestrian collisions, e-Scooters run an inherent risk of road accidents and scooter related malfunction, both having the potential to cause harm to the ride (Bozzi and Aguiler, 2021). When implementing at UBC extra caution needs to be taken to ensure major student walking routes are not compromised with an excess of micromobility transportation methods.

Lastly, despite being touted as a carbon friendly green transportation solution, there are concerns over e-Scooters and their negative environmental impacts (Bozzi and Aguilera, 2021). There are moderate environmental burdens associated with charging the scooters and manufacturing the scooters (Hollingsworth et al., 2019). The greatest environmental impact are the costs and energy associated with transporting the scooters to overnight charging stations (Hollingsworth et al., 2019).

Conclusion

Summary and Interpretation of Findings

Student opinion outlines concerns and issues surrounding the stress from rushing between classes across campus. In addition, most students cited at least some issue in attending back to back classes. While opinions may vary on the price of HOPR, the majority of students seldom use it, citing a poor user experience and difficulties finding/parking a HOPR bicycle. Lastly student responses are overwhelmingly in favour of a new campus micromobility service, particularly in the form of e-Scooters.

Existing research highlights the pros and cons of e-scooters on a university campus. There are concerns over the carbon footprint a service like this can have, and the potential of cluttering on campus with the combination of bikes, scooters, and students. However, there is a strong positive response to the use of scooters on campus, as it provides the final mile solution in transportation while being seen as a more accessible option over bicycles.

Recommendations

Adjustments can be made to the current UBC Vancouver micromobility landscape. Introducing e-Scooters is no easy task. In light of issues surrounding safety, parking, and replacing current ridesharing services, it is inadvisable to fully replace HOPR with an e-Scooter service. However, E-scooters offer a simple and effective solution to campus transportation and with certain measures in place the service can be beneficial for UBC Vancouver. Please consider the following recommendations:

- Informing the UBC Campus + Community Planning of the benefits of e-Scooter ridesharing
- Partner with an experienced e-scooter sharing company (Ex. Lime) to ensure successful implementation and operation
- Implementing E-Scooter ride sharing on campus on a pilot program basis for a semester, to be used as an adjunct with HOPR
- Consider an incentive-based model for riders who report damage or safely park their vehicle in an non-obtrusive manner
- Work with UBC Campus + Community Planning and the student body to regularly evaluate the effectiveness of the program and the safety to continually improve the service

Introducing e-Scooters to the UBC Vancouver campus can improve the accessibility for student. The goal is to encourage students to use these services to attend class on time with the overall objective of improving student life and reducing student stress.

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